

BIOLOGICAL OPINION SUMMARY
NAVAL OBSERVATORY FLAGSTAFF STATION

Date of opinion: July 23, 1998

Action agency: Department of the Navy

Project: Naval Observatory Flagstaff Station

Location: Coconino County, Arizona

Listed species affected: Mexican spotted owl (Strix occidentalis lucida)

Biological opinion: Nonjeopardy

Reasonable and prudent alternatives (RPAs): *Implementation of one of these RPAs is necessary to remove the threat of jeopardy from the proposed action. None.*

Incidental take statement:

Anticipated take: *Exceeding this level may require reinitiation of formal consultation. One Mexican spotted owl.*

Reasonable and prudent measures: *Implementation of these measures through the terms and conditions is mandatory. Two measures are provided to address effects due to disturbance from construction activity, forest thinning, and prescribed burning. A third measure is provided to address necessary monitoring.*

Terms and conditions: *Terms and conditions implement reasonable and prudent measures and are mandatory requirements. Three terms and conditions are provided to implement the three reasonable and prudent measures.*

Conservation recommendations: *Implementation of conservation recommendations is discretionary. None*



United States Department of the Interior

Fish and Wildlife Service

Arizona Ecological Services Field Office

2321 W. Royal Palm Road, Suite 103

Phoenix, Arizona 85021-4951

(602) 640-2720 Fax (602) 640-2730



In Reply Refer To:

AESO/SE

2-21-97-F-110

July 23, 1998

Mr. Michael Stroud
Department of the Navy
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190

Dear Mr. Stroud:

The U.S. Fish and Wildlife Service (Service) has reviewed the biological assessment for the Naval Observatory Flagstaff Station located in Coconino County, Arizona. Your August 20, 1997, request for formal consultation was received on August 22, 1997. This document represents the Service's biological opinion on the effects of that action on Mexican spotted owls in accordance with section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 et seq.).

This biological opinion is based on information provided in the August 1997 biological assessment, telephone conversations, field investigations, site visits, meetings, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, forest thinning and construction activities and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in the Arizona Ecological Services Office.

CONSULTATION HISTORY

Informal consultation (2-21-96-I-287) on a version of this proposal began on November 27, 1995, when the Service received a November 20, 1995, request for concurrence to proceed with a forest thinning project of approximately 65 to 90 acres of land on the U.S. Naval Observatory. On June 19, 1996, the Service responded that it could not concur with a "not likely to adversely affect" determination, and recommended that formal consultation be initiated. On August 21, 1996, the Service received an August 15, 1996, request for concurrence with a finding of no effect for the installation of a 1.3 meter telescope at the Observatory. The Service responded with a September 4, 1996, letter (2-21-96-I-404) concurring with that finding, but also recommending that a long-term operating plan for the Observatory be consulted on. The Service issued a January 9, 1997, letter regarding the concept of consultation on all Observatory

operations for a 10-year period. A meeting was held at the Observatory on March 11, 1997, to discuss issues and procedure for necessary consultation. At that meeting, the Service received a March 10, 1997, draft biological assessment of the proposed project. On March 24, 1997, in response to a request for comments within two weeks, the Service provided comments on the draft BA. On August 22, 1997, the Service received an August 20, 1997, request for formal consultation on the project. As requested, a draft biological opinion was provide to the Navy on December 19, 1997. A response to the draft opinion was received by the Service on March 23, 1988. A meeting to further discuss the draft opinion and the Navy's comments was conducted on April 8, 1998.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Most of the following project description was obtained from the August 1997 biological assessment (Tierra Data Systems 1997). The mission of U.S. Naval Observatories is to: determine positions and motions of the earth and celestial bodies, determine precise time, and provide other astronomical data required by the Navy and Department of Defense (DOD) for navigation, spacecraft tracking, precise positioning and command, control and communications. The Observatory is specifically charged with making, analyzing and interpreting astrometric and photometric dark sky observations to fulfill this mission. In addition, the Observatory conducts research to improve methods and accuracy of these astronomical observations.

The Observatory is located in the Coconino National Forest in Coconino County, Arizona, five miles west of the city of Flagstaff on Interstate 40, and about 110 miles north of Phoenix on Interstate 17. It is bordered by National Forest, Arizona State Trust, and private lands. The primary land use in the region is timber harvest, recreational tourism, and human settlement. Seasonal livestock grazing is also widespread on public lands of the area.

The Observatory is located in the Upper Gila Mountain Forest Province (Bailey 1980), in the largest contiguous forest of ponderosa pines in North America, extending for 300 miles from north-central Arizona into western New Mexico. This is a physiographically transitional area between the Colorado Plateau and Basin and Range provinces (Williams 1986). The ponderosa pine forest is part of an elevation gradient of vegetation that begins with grasslands, and continues upward through pinyon-juniper, ponderosa pine, mixed conifer, and spruce-fir plant communities.

The Flagstaff area enjoys blue skies and clean fresh air for an average of 288 days of sunshine per year. The northern Arizona airshed is among the cleanest in the United States. The greater Flagstaff area easily meets all the national ambient air quality standards for nitrogen oxide, carbon monoxide, sulfur dioxide and ozone. The greatest threat to air quality is regional haze that originates from sources as distant as Los Angeles and northern Mexico. Other factors that affect the region's air quality include forest fires, dust from unpaved roads and areas with degraded vegetative cover, vehicles and electrical power generation. The City of Flagstaff

passed an ordinance in July 1990 that prohibits the installation or sale of wood heaters or fireplace inserts that fail to meet EPA certification standards. The ordinance also prohibits the burning of coal within the city. City and county light ordinances may be the most restrictive in the country, mainly to reduce light interference for Lowell Observatory located within the city limits of Flagstaff, but this also benefits the Navy's night sky visibility.

The mountain peaks of the Flagstaff area provide the Observatory with a high-quality, clear, dark sky relatively free of light and particulate pollutants for astronomic observation. Continued success of this and other observatories in the area depends upon maintaining the quality local environment for low light and particulate pollution, and a healthy forest. The westward expansion of Flagstaff has become a concern. In particular, the disposition of Coconino National Forest lands to the east and north, and Arizona State Trust lands to the south and west is crucial to fulfilling the Navy mission.

The Navy operates a national space observatory at the Flagstaff site, benefiting both military and civilian causes. This fundamentally requires that the vicinity be protected from light and particulate pollution that results from encroachment of human settlement. Some protection is provided by a buffer of land ownership that the Navy controls, and a forest maintained in a healthy, fire-safe condition.

The United States Naval Observatory Flagstaff Station was originally established on October 14, 1955 because its remoteness provided the key combination of high-altitude, dark sky without urban light interference, and a comparatively pollution-free atmosphere. The Observatory in Washington D.C. had become severely limited due to the level of pollutants and light in the atmosphere. During the 1950s, Flagstaff was relatively undeveloped. Water resources seemed to guarantee slow growth at the time. One hundred and sixty acres were withdrawn from the State in 1957, after the land was leased for the first few years. In 1971 an additional forty acres, adjacent to the northeast boundary, was purchased to prevent development close to the facility that would lighten the dark sky. Another eighty-seven acres were purchased in 1988 for the same reasons, near Interstate 40 in the north half of section 22. Total area remains 287 acres. Although documentation is unavailable, it is presumed that the property was last harvested in the early 1950s when most old growth trees in the Flagstaff area were harvested and when the site was owned by the State of Arizona.

Day-to-day Activities

The nature of land use at the Observatory and its isolation make it a quiet place. Traffic levels are low and concentrated during commuting hours, with some activity during the night when the telescope is in use. Current staffing is at 22 people. The dome makes an occasional low, rumbling sound when it rotates. Proximity to I-40 and railroad tracks allows distant, fairly constant freeway noise and periodic, loud train disturbance.

Paved roads access the main facility and two smaller developed sites to the east and west. These roads are scheduled for occasional routine repairs, generally between May and September. Dirt

roads are infrequently maintained and some are badly rutted. The Observatory has little incentive to repair these roads as the surrounding forest is used for no other purpose than a light and pollution buffer. Some sections may be re-worked just enough to provide access for thinning operations.

An overhead utility line links the three sites. Communication among the sites is facilitated by laser beam transmissions. Water is not available locally and is trucked in, stored in three storage tanks at each of the compounds. Due to the site's high elevation, winter temperatures are often below freezing, and construction and maintenance may be limited to the 120-day frost-free season.

Operations Area

The Observatory proposes to confine its current and all future activities and construction for at least the next 10 years to within a 38-acre Operations Area. The needs of the Observatory are not likely to extend beyond the proposed Operations Area. Future development at the Observatory is limited for multiple reasons, including: light pollution from Flagstaff and vicinity; few peaks on which to put a telescope; lack of water and high cost of developing other utility corridors; additional environmental heat and light contribution of any structure, which affects astronomic viewing conditions; budget cuts; and lack of developable sites outside the Operations Area.

Plans for Optical Interferometer Support Facility

The Observatory is planning construction of an optical interferometer support building which will be an expansion of the primary Observatory facility. The project is currently at the 35-percent design stage. Funding is anticipated in 1998 (Fiscal Year 1999). An interferometer allows for more accurate star positioning than that possible by conventional methods. The main system itself, while built by the Navy, will be located at the Lowell Observatory. The support facility at the Observatory is intended to provide office and laboratory space for additional personnel, likely transferred from Washington. This project is identified by the Navy as P-029.

The building is planned to be two stories, with the upper story adjoining the current building. The lower story will open to the east onto the existing road, with a parking lot near that entrance. Construction is anticipated to involve these components: the existing leach field will be enlarged; the existing water tank will be supplemented with a similar but larger one; the new tank is planned to be adjacent to and east of the existing one; the existing water tank will remain primarily for emergency fire control while the new one will provide water for facility daily requirements.

An electrical power entrance pad will be built outside the new addition. Existing overhead power lines will be buried to cross the road between the new addition and a new power pole just the other side of the nearby road that encircles the Observatory hill.

A construction staging area will be located on the opposite side of the road from the new addition. This will be re-seeded with appropriate indigenous ground cover after use.

Excavated material will most likely be placed next to the road at the entrance gate, where possible construction of an automobile turnaround and gatehouse have been considered. Two to three trees will be removed, including one large pine and a clump of multi-stemmed, small-diameter Gambel oak.

A generally disruptive increase in noise, traffic and other disturbance is expected during the outdoor construction period for about five to six months, gradually decreasing as excavation and the exterior shell are completed and work moves indoors. Total construction time is anticipated to be 10 to 12 months. Noise from construction traffic will peak at the beginning and ending of the work day, at approximately 0700 and 1600, with noise between these periods. This is in addition to the existing noise levels associated with train and freeway traffic.

Once construction is complete, an increase in traffic and activity within the Operations Area is anticipated with personnel being relocated to the Observatory to support the interferometer project. About 20 new staff will be added, bringing the new total to 42 persons. Additional water hauling will be required to support water needs of the increased staff. Currently this occurs about once a month for each replenishment, with two to four trips depending on the truck used. This may double. Other deliveries should not result in increased traffic, since delivery of increased liquid nitrogen supply would simply be brought in on the same truck, as more volume at one time.

All of the above activities involve the removal of a single pine tree, and trimming or removal of one clump of small-diameter Gambel oak adjacent to the planned footprint of the new addition.

Timing of construction is critical in order to control cost. In the worst case, exterior shell and site work should be completed in about six or seven months. For instance, with an April 1998 start date, the shell and site remediation could be complete by October or November, with work continuing on the interior of the building beyond that. A later start could extend the total construction period by three to five months depending on the severity of winter weather and the actual start date. Since the site is quite steep and a good deal of excavation is required, weather conditions can have a major impact on the construction period. Delay would also expose the site to erosion risk in its disturbed condition for a longer period.

Additional precautions can be taken to accelerate construction cost, such as protective shelters and temporary heat, but this will be costly and may not totally eliminate extension of the construction period. Foundation work, site grading and parking improvements can only occur in periods of dry, non-freezing weather; thus they cannot be wholly completed even with protective measures. Site access for major construction equipment may also be a problem in winter, and could cause some construction delays.

Other Construction Plans

The building of P-029 is the only construction currently planned. However, other projects may occur in the next five years, all within the Operations Area boundary. The following are presented roughly in increasingly hypothetical order: water tanks for Buildings 1 and 2 need replacement; the new tanks may be either above or below ground. No trees need be removed for this replacement.

A remote possibility is to put an underground fiber optics line along the existing utility corridor that connects the three developed sites on Naval Observatory. This would involve digging a shallow trench, with no tree removal. Communication among the three sites is currently by laser beam transmission. This normally suffices except when snow on trees bends branches and gets in the laser path. Lines would go between Buildings 4, 6, 7, and 1.

An infrared telescope at Building 1 has been considered. The project remains unfunded but is on the books for FY99. An infrared telescope can operate despite light pollution, so is one of the few telescope options still open for the Observatory. No removal of trees is currently anticipated; however, some use of heavy equipment would be required.

Future construction projects

The parking lot size at the eight-inch telescope (buildings 6 and 7) may be expanded. No plans exist for this very conceptual expansion at this time. Tree removal is currently not anticipated.

The Security Officer from Washington D. C. would like a perimeter fence around the entire Observatory property, but local staff believe the more than five-mile fence is unreasonably costly, so have not agreed to its installation. Security also wants a front gate that is always locked, with a gatehouse and a turnaround area by the gate for cars to leave if it is locked.

Maintenance

Routine and emergency maintenance occurs completely within the Operations Area, and includes: road repairs using typical hot asphalt equipment and cold patching; building maintenance and repair, including but not limited to painting and cement patching. Repainting of the Observatory dome and all other facilities is scheduled shortly. Building 4 and the dome will be first, and this will take about two weeks. It will involve mechanical abrasion of the building surface coupled with a residue vacuum. Minor erosion control is periodically required around structures, including minor vegetation manipulation where appropriate. Utility corridor maintenance includes cyclic trimming of tree branches that interfere with the laser path between buildings.

Unauthorized activities on Navy property

Despite surveyed boundary posts and "No Trespassing" signs, the Observatory continues to experience some trespass. Although the dirt road at the eight-inch telescope has a padlock and chain on it, the property lacks a boundary fence and the roads on neighboring properties have uncontrolled access. Additionally, a herd of sheep passes through the property with its owner about once a year as they migrate between pastures. The Observatory can ask the herdsman not to trespass but would have to fence out the sheep at its own expense to ensure exclusion.

Forest Fuels Reduction for Wildfire Prevention, Forest Health, Structural and Biological Diversity - Thinning Objectives

Manipulation of Navy forests through silvicultural treatments and a management system of area control is proposed with these objectives: reduce the standing fuel load and the risk of catastrophic wildfire by thinning pine stands; improve individual tree and forest stand health and vigor by decreasing the number of pines per acre; restore, enhance and perpetuate stand biological and structural diversity by protecting oaks from overtopping by pines; and by improving conditions for the survival, growth and development of oaks and pines.

Prescriptions are presented for four areas to achieve these objectives. A revision of these prescriptions would be needed when: the prescriptions have been fully implemented and the desired forest fuel load reduction, structural and biological diversities are achieved; when sufficient time has passed and, in the absence of prescription implementation, natural processes have so changed the forest conditions that the prescriptions herein no longer reflect existing conditions; protocol surveys for the Mexican spotted owl document it as inhabiting Navy lands or the species is delisted; the MSO Recovery Plan expires or is significantly revised; or when sufficient land use changes have occurred that the baseline is outdated.

The prescriptions will be contractually administered by the Navy forester. Treatment will lower the wildfire hazard to facilities, personnel, operations and forest habitat at the Observatory while providing for long-term health of the forest. The creation and retention of tree species diversity and forest structural diversity are of paramount concern. An intensive inventory of the oaks in Spring 1997 on the main portion of the station revealed that the pines pose a significant threat to the oaks by overtopping them, growing up around or through the oaks. The process is quite obvious in different stages throughout the Navy property. The effects are that the geotropic pines are shading out the heliotropic oaks; are preventing development of large primordial limbs (which, when shed, will offer access to decay cavities); and are invading the oak crowns, causing physical damage and obscuring the oaks.

Given the extremely low probability of the use of fire as a silvicultural tool on Navy lands, serious consideration must be given to reducing the number of pine stems around and in oak trees in order to protect, preserve and perpetuate the oak fraction in the forest. Without intervention through silvicultural treatments or reintroduction of fire, the pines will continue to shade out the oaks. The reintroduction of fire as an element of this effort might be considered

under circumstances that could contribute to overall forest habitat management goals without jeopardizing Observatory property, functions and operations. Presently, Observatory personnel object to the use of prescribed fire because they cannot expose telescope lenses to the particulates associated with smoke, and would like to consider fire (and thus temporarily shut down night time observations) only if the thinning strategies proposed do not achieve a fire safe condition.

Forest Thinning Criteria

Treatment of up to 90 acres is proposed to reduce standing fuels by thinning dense, small-diameter "doghair" ponderosa pine thickets and other stands of ponderosa pines to 1 on 20-ft. center. More thinning (24-ft. center) is planned for the Operations Area. Treatment will require about 60 days on the ground over a 90-day period. The Navy forester is present for one week at the commencement of operations, then checks back two more times in 90 days.

Criteria for thinning balance the needs for fire hazard reduction and control with: preservation, development and perpetuation of oaks of appropriate DBH, branch and crown sizes; enhancement of MSO habitat by facilitating historical mixed species growth structure of fewer larger trees per acre; straightness of tree form; larger branch sizes in both oaks and pines; spatial evenness with a wide array of diameter sizes and ages; and avoiding excessive light (reflectance from bare ground or snow exposure), pollen, soot, and dust for the Observatory's telescope and viewing sky. Criteria closely parallel those already approved by USFWS (2-21-95-I-018) for the NOFS-Arboretum Fuels Reduction Project Biological Evaluation (October 4, 1994) conducted by the Forest Service on property adjoining that of the Observatory.

This will be accomplished through a forest management system of area control into four management zones: southern slope, Operations Area, northern slope, and northern end. Due to the small size of the Navy forest lands, it is neither advisable nor feasible to fragment the forest into a large number of stands equal to the rotation age. Rather, larger areas will be addressed in order to simplify management and MSO habitat considerations. The spacing requirement helps avoid large gaps in vegetation distribution which can result from adhering too rigidly to a size prescription. While gaps allow light into a stand which enhances regeneration, they also allow excessive light reflectance which impacts astronomic viewing conditions. Treatments are designed for spatial evenness both for development of large trees and to reduce reflectance. The following are the specifications for the fuels reduction, forest health, structural and biological diversity project thinnings.

General Silvicultural Treatment Criteria

No oaks, standing oak snags or junipers will be cut. Thinning will focus on pines.

Thinning may occur throughout the Navy property.

All snowbents will be cut.

Woody debris (slash) treatments will emphasize maximum fire safety. Limbs and tops cut from merchantable stems will be treated in accordance with slash disposal requirements. The term "slash" for the purpose of this thinning means all woody debris created on the thinning area by logging and related operations or windstorm. Slash is to be treated in one of the two following methods: lopped to no more than 6 feet in length and stacked or deposited in "haystack" or "teepee" piles no larger than 10 feet in diameter and 12 feet tall; or chipped or shredded and either broadcast strewn no deeper than 10 inches deep at any point, or placed in piles no larger than 10 feet in diameter and 10 feet tall. Dispersing untreated slash in a lop and scatter method would result in too high a risk of losing control of a fire within the Navy property if it were prescribed burned later or subject to a wildfire; or Individual trees may be cut if they are near a powerline or fenceline.

Leave trees will be selected on the following basis and criteria:

Ponderosa pine is the only species to be considered for cutting and removal. Deciduous trees may not be selected as Leave Trees.

Selected pines are to be free of defects, disease or damage to the extent possible, consistent with spacing and Leave Tree count per acre requirements.

Fastest growth as evidenced by larger relative diameter breast high (DBH), greatest height, and light colored bark with active, buff colored crevices.
Good form and straightness of the bole.

Spacing as near as possible to 20 feet by 20 feet, on centers, for a uniform and consistent distribution of 100 trees per acre.

Dead trees and non-merchantable culls are not to be selected as Leave Trees, but are to be left uncut when possible; they may not be counted towards the requirement of 100 live Ponderosa pine Leave Trees per acre.

Trees to be cut and removed shall be selected and cut, using care and directional felling, so as to avoid damage to Leave Trees and oaks. Leave Trees and oaks damaged by the faller shall be paid for at the rate of \$50 each. Excessive Damage is defined as breaking off the top, or removing bark or a limb, that leaves exposed an area greater than 28 square inches. Trees so damaged may not be felled or removed.

Standing dead trees and non-merchantable culls shall be left uncut.

Trees cut along Navy property line boundaries shall be felled into Navy land so as to contain slash and debris on the Navy property.

Stumps shall be cut as low as practicable and shall not exceed 12 inches or one tree DBH in height.

Limbs and tops are to be cut from merchantable stems and treated in accordance with slash disposal requirements. The term "slash" for the purpose of this thinning means all woody debris created on the thinning area by logging and related operations or windstorm. Slash is to be treated in one of the two following methods: lopped to no more than 6 feet in length and stacked or deposited in "haystack" or "teepee" piles no larger than 10 feet in diameter and 12 feet tall; or chipped or shredded and either broadcast strewn no deeper than 10 inches deep at any point, or placed in piles no larger than 10 feet in diameter and 10 feet tall.

Southern Slope Treatment Criteria

The Southern Slope Area has per acre basal areas of approximately 96.7 square feet/acre (SF/AC) for ponderosa pine (1992 inventory) and 18.1 SF/AC for oaks (1997 inventory).

The General Silvicultural Treatment Criteria above apply.

Live Ponderosa pines will be thinned to 20 feet on center, leaving 100 pine trees per acre. No oaks are to be cut. Leave tree selection and cutting criteria are: One hundred (100) of the best live Ponderosa pines shall be left uncut and undamaged as Leave Trees on each acre of the area. This equates to a spacing of approximately 20 feet on center between Leave Trees. Oak trees and any other deciduous or coniferous tree species do not count towards the 100 Leave trees per acre and will be additional stems left undamaged. Trees marked with yellow paint and/or signs are designated as wildlife and structural diversity trees, and are to be left uncut and undamaged. Live trees so marked are in addition to the 100 Leave Trees per acre. Dead wildlife trees may not be included in the 100 trees per acre count.

Leave trees shall be selected on the basis and criteria described above.

Operations Area Treatment Criteria

The Operations Area has per acre basal areas of approximately 85 square feet/acre (SF/AC) for ponderosa pine (1992 inventory) and 13.7 SF/AC for oaks (1997 inventory).

General Silvicultural Treatment Criteria above apply.

Live Ponderosa pines will be thinned to 24 feet on center, leaving approximately 75 pine trees per acre. No oaks are to be cut. Leave tree selection and cutting criteria are: Seventy-five of the best live Ponderosa pines shall be left uncut and undamaged as Leave Trees on each acre of the area. This equates to a spacing of approximately 24 feet on center between Leave Trees. Oak trees and any other deciduous or coniferous tree species do not count towards the 75 Leave trees per acre and will be additional stems left undamaged. Trees marked with yellow paint and/or signs are designated as wildlife and structural diversity trees, and are to be left uncut and undamaged. Live trees so marked are in addition

to the 75 Leave Trees per acre. Dead wildlife trees may not be included in the 75 trees per acre count.

Leave trees shall be selected on the above basis and criteria, except for the following:

Spacing as near as possible to 24 feet by 24 feet, on centers, for a uniform and consistent distribution of 75 Ponderosa pine Leave Trees per acre.

Dead trees and non-merchantable culls are not to be selected as Leave Trees, but are to be left uncut when possible; they may not be counted towards the requirement of 75 Leave Trees per acre.

Northern Slope Area Treatment Criteria

The Northern Slope Area has per acre basal areas of approximately 103.6 square feet/acre (SF/AC) for ponderosa pine (1992 inventory) and 13.7 SF/AC for oaks (1997 inventory).

General Silvicultural Treatment Criteria above apply.

Live Ponderosa pines will be thinned to 20 feet on center, leaving 100 pine trees per acre. No oaks are to be cut. Leave tree selection and cutting criteria are: One hundred (100) of the best live Ponderosa pines shall be left uncut and undamaged as Leave Trees on each acre of the area. This equates to a spacing of approximately 20 feet on center between Leave Trees. Oak trees and any other deciduous or coniferous tree species do not count towards the 100 Leave trees per acre and will be additional stems left undamaged. Trees marked with yellow paint and/or signs are designated as wildlife and structural diversity trees, and are to be left uncut and undamaged. Live trees so marked are in addition to the 100 Leave Trees per acre. Dead wildlife trees may not be included in the 100 trees per acre count.

Leave trees shall be selected on the basis and criteria described above.

Northern End Area Treatment Criteria

The Northern End Area has per acre basal area of approximately 122.93 square feet/acre (SF/AC) for ponderosa pine (1992 inventory). Oaks were not measured in this area, since it is relatively flat, mostly doghair pine stands and had not been identified as suitable MSO habitat.

General Silvicultural Treatment Criteria above apply.

Live Ponderosa pines will be thinned to 20 feet on center, leaving 100 pine trees per acre. No oaks are to be cut. Leave tree selection and cutting criteria are: One hundred (100) of the best live Ponderosa pines shall be left uncut and undamaged as Leave Trees on each acre of the area. This equates to a spacing of approximately 20 feet on center between Leave Trees. Oak trees and any other deciduous or coniferous tree species do not count towards

the 100 Leave trees per acre and will be additional stems left undamaged. Trees marked with yellow paint and/or signs are designated as wildlife and structural diversity trees, and are to be left uncut and undamaged. Live trees so marked are in addition to the 100 Leave Trees per acre. Dead wildlife trees may not be included in the 100 trees per acre count.

Leave trees shall be selected on the basis and criteria described above.

Contingency Silvicultural Treatments

If additional fuel reduction is needed beyond the thinnings, consideration will be given to hand pruning pine limbs to a specified distance above grade.

Additional pruning of lower limbs might be considered 5 to 10 years after the first pruning.

If acceptable to the Observatory, up to 20 thinning debris (slash) piles might be burned per year.

If broadcast burning can be conducted in a manner acceptable to the Observatory, duff around large or snag oaks and pines will be scraped or lined to protect the trees from fire. The burning prescription will be such that the result will be a low-intensity fire that protects the dead and down material which supports the prey base for the MSO. Such burning is valuable for increasing the probability of natural regeneration. Because natural fire was the major pre-settlement factor in shaping and maintaining southwestern ponderosa pine ecosystems, it is logical to consider applied fire in a management scheme to relieve the serious health problems that plague these forests due to many years of fire exclusion (Sackett, Husse and Harrington 1996). For broadcast burning, a permit would be sought from the Arizona Department of Environmental Quality to ensure there would be no effects on the city of Flagstaff, since prevailing winds come from the southwest.

There may be a need to improve the herbaceous understory once thinning is completed. This would address multiple objectives: decreasing snow reflectance, reducing pollen production by emphasizing grasses over pines, reducing fugitive dust, and increasing granivores (animals that eat grass seed) to improve foraging for the MSO. Suggested plants would be Arizona fescue, Penstemon barbatus, or Eriogonum sp.

Proposed Mitigation Measures

The Observatory does not intend to adopt the 10-year monitoring guidelines described in the Recovery Plan for land within PACs, which stipulate that pre- and post-treatment assessments of owl occupancy and habitat conditions be conducted. The Navy considers its lands to be outside of a PAC.

Dirt roads will not be upgraded and chained off wherever practical to minimize trespassing that may result in illegal cutting of oaks for fuelwood.

Limiting development to the Operations Area will provide future development protection to key property areas that have the most potential for attracting the MSO.

The Navy will sponsor protocol MSO surveys for 1997 (already completed with no sightings), 1998, and 1999 at a cost of \$19,500. This work will be performed under a cooperative agreement between the Navy and the U.S. Forest Service.

Results of MSO surveys will be sent to the Navy monthly to keep project and construction personnel apprised of MSO. If an MSO is detected on or within 1/2 km of Navy property, the Navy will, after consulting with survey personnel, notify the FWS within 72 hours of the detection.

If a nest or recurring roost is located within 1/4 mile of proposed construction, stipulations of this consultation will be renegotiated for breeding timing restrictions (March 1 - August 31) on outdoor construction.

If prescribed burning is conducted, large or snag oaks and pines will be protected by lining or scraping around them.

Steep drainages within the PAC and outside the Operations Area will incur the minimum amount of thinning required for fire control, while preserving a clumping pattern and complex stand structure around all large or snag oaks and pines.

The Observatory will attempt to avoid the MSO breeding season wherever possible while still meeting project construction goals.

STATUS OF THE SPECIES

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (USDI 1993) and in the Final MSO Recovery Plan (USDI 1995). The information provided in those documents is included herein by reference. Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, much remains unknown about the species' distribution and ecology. This is especially true in Mexico where much of the MSO's range has not been surveyed. The MSO currently occupies a broad geographic area but does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to forested isolated mountain systems, canyons, and in some cases, steep, rocky canyon lands. The primary administrator of lands supporting MSO in the United States is the U.S. Forest Service. Most owls have been found within Forest Service Region 3 (including 11 National Forest in Arizona and New Mexico). Forest Service Regions 2 and 4 (including 2 National Forests in Colorado and 3 in Utah) support fewer owls. According to the Recovery Plan, 91% of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service.

Surveys have revealed that the species has an affinity for older, well-structured forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico. The range of the MSO has been divided into six Recovery Units (RUs), as discussed in the MSO Recovery Plan (USDI 1995). The Recovery Plan reports an estimate of owl sites. An owl "site" is defined as a visual sighting of at least one adult owl or a minimum of two auditory detections in the same vicinity in the same year. This information was reported for 1990-1993. The greatest known concentration of known owl sites in the United States occurs in the Upper Gila Mountains RU (55.9%), followed by the Basin and Range-East RU (16.0%), Basin and Range-West RU (13.6%), Colorado Plateau RU (8.2%), Southern Rocky Mountain-New Mexico RU (4.5%), and Southern Rocky Mountain-Colorado RU (1.8%). Owl surveys conducted from 1990 through 1993 indicate that the species persists in most locations reported prior to 1989.

A reliable estimate of the absolute numbers of MSO throughout its entire range is not available (USDI 1995) and the quality and quantity of information regarding numbers of MSO vary by source. USDI (1991) reported a total of 2,160 owls throughout the United States. Fletcher (1990) calculated that 2,074 owls existed in Arizona and New Mexico.

At the end of the 1995 field season, the Forest Service reported a total of 866 management territories (MTs) established in locations where at least a single MSO had been identified (U.S. Forest Service, *in litt.* November 9, 1995). The information provided at that time also included a summary of territories and acres of suitable habitat in each RU. Subsequently, a summary of all territory and monitoring data for the 1995 field season on Forest Service lands was provided to the Service on January 22, 1996. There were minor discrepancies in the number of MTs reported in the November and January data. For the purposes of this analysis we are using the more recent information. Table 1 displays the number of MTs and percentage of the total number of each Forest (U.S. Forest Service, *in litt.*, January 22, 1996).

The Forest Service has converted some MTs into PACs following the recommendations of the Draft MSO Recovery Plan released in March 1995. The completion of these conversions has typically been driven by project-level consultations with the Service and varies by National Forest.

Table 1. Number of management territories (MTs) as reported by the Forest Service (U.S. Forest Service, *in litt.*, January 22, 1996), percent of MTs as a proportion of the MTs in Forest Service Region 3, and the percent of suitable habitat surveyed in each Forest by National Forest (Fletcher and Hollis 1994).

National Forest	Number of MTs	Percent of MTs	Percent Suitable Habitat Surveyed
Apache-Sitgreaves	122	14.0	99
Carson	3	0.3	62
Cibola	43	5.0	41
Coconino	155	17.8	87
Coronado	108	12.4	49
Gila	197	22.7	50
Kaibab	6	0.7	96
Lincoln	126	14.5	90
Prescott	10	1.2	42
Santa Fe	33	3.8	44
Tonto	66	7.6	55
TOTAL	869	100	

The Naval Observatory project area is located at the northern edge of the Upper Gila Mountains RU as defined by the MSO Recovery Plan (USDI 1995). This RU is a relatively narrow band bounded on the north by the Colorado Plateau RU and to the south by the Basin and Range West RU. The southern boundary of this RU includes the drainages below the Mogollon Rim in central and eastern Arizona. The eastern boundary extends to the Black, Mimbres, San Mateo, and Magdalena Mountain ranges of New Mexico. The northern and western boundaries extend to the San Francisco Peaks and Bill Williams Mountain north and east of Flagstaff, Arizona. This is a topographically complex area consisting of steep foothills and high plateaus dissected by deep forested drainages. This RU can be considered a "transition zone," because it is an interface between two major biotic regions: the Colorado Plateau and Basin and Range Provinces (Wilson 1969). Habitat within this RU is administered by the Kaibab, Coconino, Apache-Sitgreaves, Tonto, Cibola, and Gila National Forests. The north half of the Fort Apache and northeast corner of the San Carlos Indian Reservations are located in the center of this RU and

contain an important habitat link between owl subpopulations at the western and eastern ends of the RU and the subpopulations directly south within the Basin and Range West RU.

This RU consists of deep forested drainages on the Mogollon Plateau. Vegetation generally consists of pinyon/juniper woodland, ponderosa pine/mixed conifer forest, some spruce/fir forest, and deciduous riparian forest in mid and lower elevation canyon habitat. Climate is characterized by cold winters and over half the precipitation falls during the growing season. Much of the mature stand component on the gentle slopes surrounding the canyons has been partially or completely harvested. Most of the forest habitat on steeper ground that may serve as MSO nesting habitat is in suitable condition. MSO are widely distributed and use a variety of habitats within this RU. Owls most commonly nest and roost in mixed-conifer forests dominated by Douglas fir and/or white fir and canyons with varying degrees of forest cover (Ganey and Balda 1989; USDI 1995). Owls also nest and roost in ponderosa pine-Gambel oak forest, where they are typically found in stands containing well-developed understories of Gambel oak (USDI 1995).

This RU contains the largest known concentration of MSO with approximately 55% of known MSO territories (USDI 1995). This RU is located near the center of the MSO's range within the United States and is contiguous to four of the other five RUs within the United States. Because of its central location and its large and relatively continuous spotted owl population, the MSO Recovery Team believes that the population in this RU could be uniquely important to the overall stability and persistence of the MSO population in the United States. Specifically, this population could serve as the source population, providing immigrants to smaller, more isolated populations in other RUs. Although the Recovery Team has no data on dispersal patterns or movements between RUs, the Recovery Team believes that this population should be maintained at current levels and with at least the current level of connectivity within the RU (USDI 1995). Significant discontinuities that develop in the MSO's distribution within this RU, and the loss of habitat to support the local sub-populations, may compromise the recovery of the species.

ENVIRONMENTAL BASELINE

Most of this section was obtained from the biological assessment (Tierra Data Systems 1997). The Naval Observatory property of 287 acres is situated within the mountainous region of Coconino County, five miles west of the city of Flagstaff. It is mostly hilly, with the three telescopes on top of knolls. Elevation ranges from a low of 7,305 feet above sea level to a high of 7,575 feet at Building One. The hills have relatively steep sides with slopes generally ranging from 20 to over 40 percent, which restricts future development to the tops of the knolls or the ridgelines between the knolls. All of the soil types on Navy property are rated for a 65 percent potential canopy cover of ponderosa pine. A ponderosa pine forest dominates the Observatory property, with some meadow swales. Gambel oak is interspersed among the pines, including on the knoll that supports the primary telescope and facility. Arizona fescue (*Festuca arizonica*) is the most common understory species. Areas of mature pine and large oaks occur in two drainages north of the main facility.

The condition of the forest is altered from what is believed to be the natural, more open ponderosa pine structure with much less canopy closure, larger trees and much more grassland. Fire suppression and modified land use practices with the arrival of European settlement are believed to be the cause of the change. The resulting Observatory ponderosa pine forest has thickets of sapling-sized pines, duff build-up, and lacks diversity in species and stand structure. It develops a fire hazard because of excessive floor (duff) and "ladder" fuels (such as the thickets), and risk of catastrophic losses by severe fires that access the forest canopy. Trees eventually become stressed because of their excessive density, and the forest declines in overall health. The Navy property shows some sign of mistletoe and slightly higher than endemic levels of insect activity (Pajkos, pers. comm. 1997), both indicators of a stressed condition.

Portions of the forest were cruised in March 1997, with 100 percent sample of oaks within the bounds of the survey. The northern portion is cooler because of north-facing slopes, and includes some steep canyon draws, while the south-side volcanics heat up far too much to be appropriate nesting habitat. The data provide evidence of oak stress on the northern slopes. No regeneration of oaks was evident on the property. Oaks in general were found to be quite old and slow-growing, based on ring counts on stumps located at the Observatory. Many were being overtopped by pines. This phenomenon of old oaks dying without regeneration is increasingly being found in the Coconino National Forest area, especially where cattle or elk graze basal shoots (J. Ganey, pers. comm. 1997).

The BA (Tierra Data Systems 1997) provided information indicating that the entire Observatory is composed of the pine-oak vegetation type. The pine-oak vegetation type is considered to be a restricted area per the recovery plan. Portions of the pine-oak vegetation type within the Observatory boundary also exhibit slopes greater than 40%. Pine-oak vegetation with slopes greater than 40% are considered to be protected areas per the recovery plan. The BA identified four primary "types" of pine-oak vegetation: dense pine-oak with greater than 40% slope, dense pine-oak, open to moderately dense pine-oak with greater than 40% slope, and open to moderately dense pine-oak. Approximately 40.58 acres of the Observatory have slopes of greater than 40%. Dense pine-oak with greater than 40% slope covers 20.39 acres. Dense pine-oak consists of 35.35 acres. Open to moderately dense pine-oak with greater than 40% slope constitutes 20.19 acres. Open to moderately dense pine-oak covers 214.5 acres.

The BA delineated four proposed thinning management areas for the Observatory. Those four areas were referred to as the Southern Slope, Operations Area, Northern Slope, and Northern End. The Southern Slope unit is primarily open to moderately dense pine-oak, with small portions of that with slopes greater than 40%. The Operations Area is also mostly open to moderately dense pine-oak, but it also contains small portions of open to moderately dense pine-oak with greater than 40% slope, dense pine-oak, and dense pine-oak with greater than 40% slope. The Northern Slope unit contains primarily dense pine-oak and dense pine-oak with greater than 40% slope, and smaller portions of the other two types. The Northern End is primarily open to moderately dense pine-oak with small portions of the other three types.

In addition to the Observatory being completely pine-oak vegetation (restricted areas per the recovery plan) and portions of it with slopes greater than 40% (protected area), almost the entire southern half of the Observatory is within a Mexican spotted owl PAC. That PAC is known as the Dry Lake PAC and is represented in Appendix 1. PACs are also protected areas per the recovery plan. The PAC is based on several (at least 6) Mexican spotted owl responses, including a single confirmed individual (possibly a female observed in June), received during survey efforts in 1994. Four responses were obtained in the eastern part of the PAC, and two were obtained in the western part just south of the Observatory. Other possible but questionable responses were obtained either adjacent to or on the Observatory. The BA indicated that complete surveys were conducted in the vicinity of the Dry Lake PAC in 1990-92, 1993, 1994, 1995, and 1997. No nest location has been discovered for this PAC.

In a September 17, 1996, letter from the Arizona State Land Department, a boundary for the Dry Lake PAC was presented to the Service and described as being tentatively agreed upon by ASLD, the Navy, and the Forest Service. The letter stated that PAC contained all pine-oak, steep slope and mixed conifer areas within the old (Lockness) management territory. The letter stated that the design of the PAC was intended to provide for a "replacement PAC" as urban development surrounds the center of owl activity at Dry Lake. In an April 17, 1997, letter, the Forest Service stated support for the PAC delineation outlined in the Arizona State Land Department letter. In a July 2, 1997 response to the Arizona State Land Department, the Service agreed that all areas presented by the Arizona State Land Department would be in the PAC recognized by the Service. That letter also included some minor additions at the edge of those areas and stated that a connection between the two subunits should be included and asked the Arizona State Land Department to assist in identifying that addition. The ASLD has not officially responded to that request. However, a recent telephone conversation indicated that ASLD will not provide assistance in identifying an appropriate connection between the two portions of the PAC (Keith Pajkos, pers. comm., 1997). Recent conversation with a member of the Mexican spotted owl recovery team resulted in a confirmation of an earlier recommendation that the two portions of the PAC should be connected (Pat Ward, pers. comm., 1997). Thus, the Service determined a connection based on information obtained from previous management territory maps. Figure 1 represents the Dry Lake PAC.

Recent management activities that have occurred in the project area include the following that were identified in the BA. Harvest of trees less than 12 inches dbh occurred sometime in the 1990s just west of the southern portion of what is now the Dry Lake PAC. The 1992 Lebaron Timber sale harvested 122 acres in the southernmost part of what is now the Dry Lake PAC. A 1996 forest thinning project occurred on private land just east of the southern section of the Dry Lake PAC. Another 1996 thinning project involving trees less than five inches dbh occurred on private land just north of the Observatory and the Dry Lake PAC. A 1996 forest thinning project of trees less than 9 inches dbh occurred on state land in Section 26. A 1996 thinning project occurred on Forest Service land just east of the Dry Lake PAC. A 1997 thinning project occurred on Forest Service land just north and east of the northern portion of the Observatory and Dry Lake PAC.

Approximately 198 projects conducted by a variety of agencies in Arizona and New Mexico have received formal consultation since August 1993. These projects have resulted in the anticipated take of approximately 102 owls.

EFFECTS OF THE ACTION

The Navy believes (Tierra Data Systems 1997) that there are no direct effects expected on the MSO because it is not currently nesting on the Observatory property, as far as both protocol and informal surveys have shown since 1990. The Navy stated that no MSO has been observed nesting, foraging or roosting on Observatory lands. No spotted owl has been observed near the Observatory since 1994, except when a dispersing juvenile flew between south Flagstaff and the Navajo Depot, possibly close to the Observatory property, in October of 1995.

The Navy also stated the following in the BA regarding effects of the action (Tierra Data Systems 1997). Construction activity takes place in the daylight; the MSO avoids most of this disturbance by being primarily nocturnal. The rumble of the rotating Observatory dome at night as it moves is not expected to adversely affect the owl because of its routine nature and short duration. The effect of both constant or periodic noise on the MSO in this relatively quiet environment is not known. Ambient noise levels are probably less than 50 dBA, but noise from the nearby freeway and passing trains already occur, regularly loud enough to disrupt ordinary speaking communication between individuals (Burr, pers. comm. 1997).

The Navy stated that thinning operations will take place outside the breeding season so will have no adverse noise effect (Tierra Data Systems 1997). Observatory activities such as new construction may affect foraging on a short-term basis. No snags, large trees, downed logs or oak stands will be affected. Thinning will promote further recruitment of all of these habitat elements, by allowing growth of larger trees. Piling of slash may provide cover for prey species, thus enhance their population.

The Navy (Tierra Data Systems 1997) stated that although it is the strong desire of the Observatory to find means to control fuel accumulation without prescribed fire because of operational disruptions, such a technique would benefit some prey species such as Peromyscus and Neotoma by increasing food supply, but may result in concurrent declines of other species. Peromyscus and Neotoma are primarily granivores and thinning should result in more understory grasses. Ground nesting birds and burrowing animals which could be MSO prey may be affected by the prescribed fire. Downed logs which provide cover for many small mammals will be protected by only burning when fuel moisture is high. Prescribed fire may affect MSO habitat since it could get out of control and result in habitat loss. However, this is minimized by burning only when soil moisture is high.

The Service believes that effects of the action on the Mexican spotted owl could occur due to two primary means. One is disturbance of the normal behavior of owls due to construction and operations. The other is modification of restricted and protected owl habitat.

No owl nest location has been determined for the Dry Lake PAC. The known owl locations suggest that the portion of the PAC on the Observatory should not be ruled out as an area that could support owl nesting, roosting, and foraging. Because no nest or roost sites have been discovered within the PAC, and because the operations and construction areas are within habitat that could possibly be used for nesting, roosting and foraging, normal owl behavior could be adversely affected. The recovery plan calls for activities to occur within a PAC only outside of the breeding season (March 1 through August 31) to minimize any potential deleterious effects on the owl during the breeding season. At least some of the planned construction activities are being proposed to occur during the owl breeding season. Thus, these activities present an adverse effect to owls.

The recovery plan calls for no harvest of trees greater than nine inches diameter breast height in protected areas, and that harvest of trees smaller than that is only permitted as it pertains to abatement of fire risk. Thus, removal of trees within the PAC, up through nine inches dbh is allowed. The Navy stated (Tierra Data Systems 1997) that such proposed removal would be done outside of the breeding season. However, the description of the proposed removal of trees for the forest thinning did not include an upper diameter limit of nine inches within protected areas. Therefore, trees greater than nine inches dbh are proposed for removal. Thus, the proposed forest thinning presents an adverse effect to owls.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of ESA.

Cumulative effects are likely to arise from primarily two activities that can be expected to occur in the vicinity of the project area and the Dry Lake PAC. The first is anticipated development of private land immediately north of a portion of the PAC at Dry Lake Hill. It is likely that the development will occur either within or adjacent to the home range of owls(s) occupying the PAC.

The other primary cumulative effects may arise from projects that are likely to be conducted by the Arizona State Land Department on state lands that are either within or adjacent to the Dry Lake PAC. Those projects could include silvicultural treatments, and there apparently is a thinning project proposed on state land just east of the southern portion of the Dry Lake PAC. The cumulative effects from these two anticipated activities alone could result in significant impacts to the owl(s) occupying the area. The effects include loss of habitat and modification of normal owl behavior.

The BA also included mention of additional cumulative effects. There are three operating cinder pits near Sinclair Wash (and adjacent to the PAC) and a flood control dam is currently proposed

for Sinclair Wash. The City of Flagstaff population doubled from 1970 to 1995. Pressure will continue for release of state and federal lands for development.

CONCLUSION

After reviewing the current status of the Mexican spotted owl, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Mexican spotted owl.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Department of the Navy has a continuing duty to regulate the activity covered by this incidental take statement. If the Department of the Navy (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that one Mexican spotted owl could be taken as a result of this proposed action. The incidental take is expected to be in the form of harm due to disturbance and loss of habitat. The Service anticipates incidental take of Mexican spotted owls will be difficult to detect for the following reasons: species numbers may be difficult to detect when the species is wide-ranging; it has small body size; finding a dead or impaired specimen is unlikely; losses may be masked by seasonal fluctuations in numbers or other

causes; and the species occurs in habitat that makes detection difficult. Thus, determination of incidental take will be tied to the prescription of the proposed action. If the thinning prescription is not followed or is exceeded in any manner, then the anticipated incidental take will be considered to be exceeded. If, during the course of the action, the amount or extent of the incidental take anticipated is exceeded, the Department of the Navy must reinstate consultation with the Service immediately to avoid violation of section 9. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). An explanation of the causes of the taking should be provided to the Service.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take:

1. Possible disturbance to Mexican spotted owls from activities associated with planned new construction and forest thinning at the Observatory will be minimized to the greatest extent possible. It is not necessary to consider or include normal routine maintenance and repair conducted at the Observatory under this reasonable and prudent measure.
2. Any proposed prescribed burning will be adequately addressed and planned regarding resulting effects to Mexican spotted owls.
3. All silvicultural or prescribed fire treatments will be adequately monitored.

The Federal agency (or designated applicant or contractor) as part of their action will provide a means to determine the level of incidental take that actually results from the project.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of ESA, the Department of the Navy must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. Terms and conditions for reasonable and prudent measure 1:
 - a. To the greatest extent reasonably possible, outdoor construction activities associated with the planned optical interferometer support building (P-029) will be conducted outside

of the Mexican spotted owl breeding season. The Mexican spotted owl breeding season is March 1-August 31. This term and condition is not intended to prohibit construction activities for this project within the breeding season, but it is intended to ensure that those activities will be minimized to the greatest extent during that time.

b. All other future major construction projects that were discussed in the biological assessment will either be conducted outside of the breeding season or they will undergo further consultation with the Service at the appropriate stage of development.

c. All thinning operations in the Dry Lake PAC will be conducted only outside of the breeding season.

2. Term and condition for reasonable and prudent measure 2:

Any proposed prescribed fires planned for the Observatory will be conducted strictly within all of the guidelines found on pages 84-95 of the Mexican spotted owl recovery plan or they will undergo further consultation with the Service at the appropriate stage of development.

3. Term and condition for reasonable and prudent measure 3:

Monitoring of the project area and other areas that could be affected by the proposed action shall be done to ascertain take of individuals of the species and/or of its habitat that causes harm or harassment to the species. This microhabitat monitoring will be accomplished using one of the following: a procedure developed by the Navy and acceptable to the Service, a procedure already developed as a result of consultation regarding other similar projects and adopted by the Navy, or the protocol that is being developed for Mexican spotted owl microhabitat monitoring by the Forest Service.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures the Service believes that no more than one Mexican spotted owl will be incidentally taken. If, during the course of the action, this minimized level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

The extent that this statement concludes that take of any threatened or endangered species of migratory bird will result from the agency action for which consultation is being made, the Service will not refer the incidental take of any such migratory bird for prosecution under the MBTA of 1918, as amended (16 U.S.C. Sections 703-712), or the Bald Eagle Protection Act of 1940, as amended (16 U.S.C. Sections 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

CONSERVATION RECOMMENDATIONS

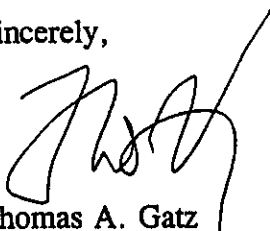
Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. No conservation recommendations are provided in this biological opinion.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the request for consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your efforts in conserving listed species. For further information please contact Bill Austin or Bruce Palmer. Please refer to consultation number 2-21-97-F-110, in future correspondence concerning this project.

Sincerely,



Thomas A. Gatz
Acting Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque NM (GMA)
District Ranger, Peaks Ranger District, Flagstaff AZ

Director, Arizona Game and Fish Department, Phoenix AZ
Commissioner, Arizona State Land Department, Phoenix AZ
Keith Pajkos, Arizona State Land Department, Flagstaff AZ

LITERATURE CITED

- Bailey, R. G. 1980. Descriptions of the ecoregions of the United States. USDA Forest Service. Misc. Publication. 1391, Intermountain Region, Ogden, Utah. 77 p.
- Fletcher, K. 1990. Habitat used, abundance, and distribution of the Mexican spotted owl, *Strix occidentalis lucida*, on National Forest System Lands. U.S. Forest Service, Southwestern Region, Albuquerque, New Mexico. 78 pp.
- Fletcher, K., and H. Hollis. 1994. Habitat used, abundance, and distribution of the Mexican spotted owl, *Strix occidentalis lucida*, on National Forest System lands. U.S. Forest Service, Southwestern Region, Albuquerque, New Mexico. 86 pp.
- Ganey, J.L. and R.P Balda. 1989. Distribution of habitat use of Mexican spotted owls in Arizona. Condor 91: 355-361.
- Sackett, S. S.; Haase, S. M.; Harrington, M. G. 1996. Lessons learned from fire use for restoring southwestern ponderosa pine ecosystems. General Technical Report RM; GTR-278. Conference on adaptive ecosystem restoration and management: restoration of Cordilleran conifer landscapes of North America, June 6-8, 1996, Flagstaff, Arizona. Fort Collins, CO: U.S.D.A. Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.
- Tierra Data Systems. 1997. Biological assessment: Mexican spotted owl Naval Observatory Flagstaff Station. Contract No. N68711-95-D-7605/0025, Southwest Division, Naval Facilities Engineering Command, San Diego.
- U.S. Department of the Interior, Fish and Wildlife Service. 1991. Mexican spotted owl status review. Endangered species report 20. Albuquerque, New Mexico.
- U.S. Department of the Interior, Fish and Wildlife Service. 1993. Endangered and threatened Wildlife and Plants; final rule to list the Mexican spotted owl as threatened. Federal Register. 58:14248-14271.
- U.S. Department of the Interior, Fish and Wildlife Service. 1995. Mexican Spotted Owl Recovery Plan. Albuquerque, New Mexico.
- Williams, J. L. 1986. New Mexico in maps. University New Mexico Press, Albuquerque. 409 p.
- Wilson, E.D. 1969. A resume of the geology of Arizona. University of Arizona Press, Tucson. 140 pp.

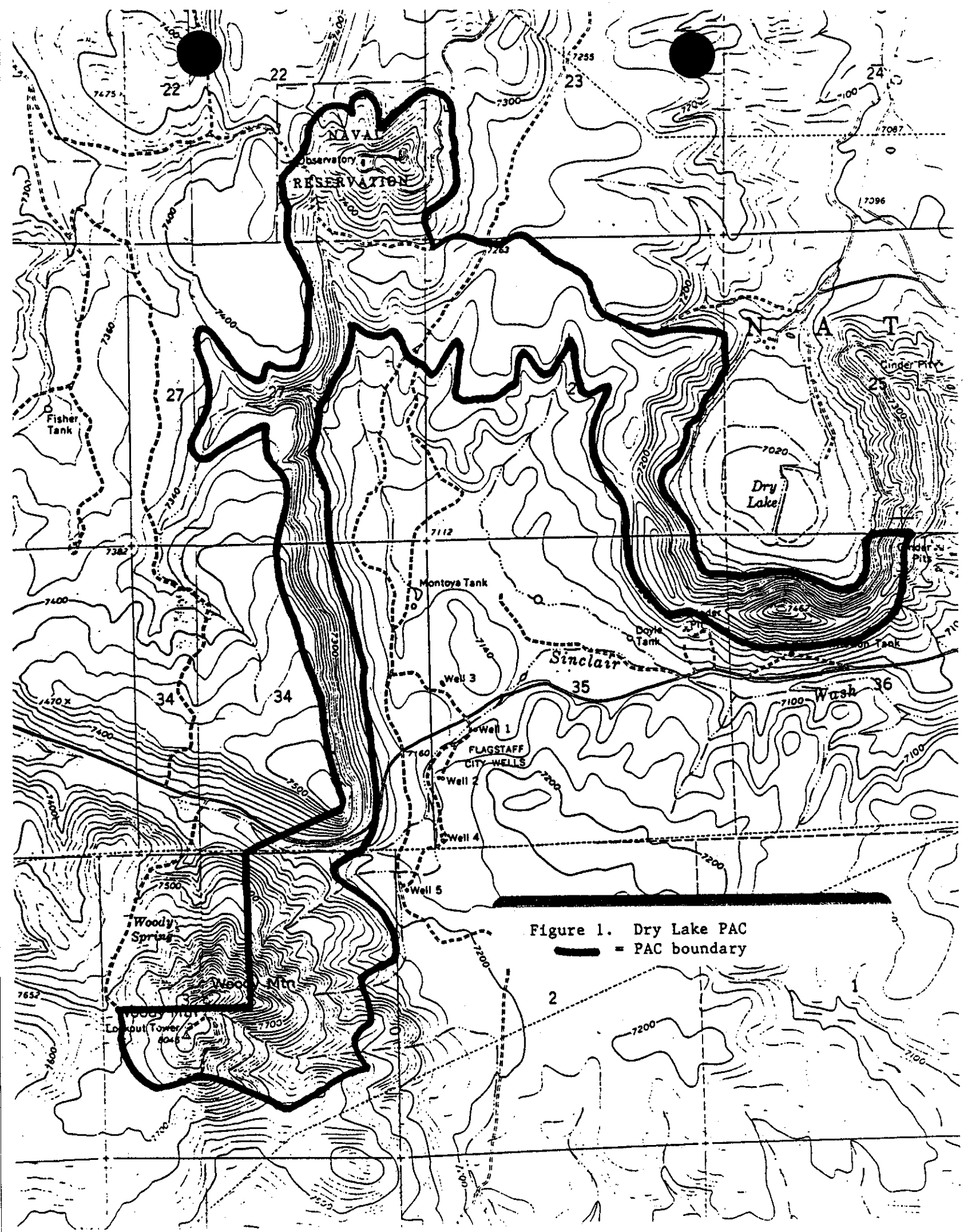


Figure 1. Dry Lake PAC
— = PAC boundary



DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

11015
Ser 5733TB/283
JUL 02 1998

mid
7-13

Ms. Jennifer Fowler-Propst
Acting Field Supervisor
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, AZ 85021-4951

PA. AL. 452

RE: AESO/SE Consultation No. 2-21-97-F-110

Dear Ms. Fowler-Propst:

We have reviewed the revised draft Biological Opinion dated April 15, 1998 and agree with its content with a couple of minor changes detailed on the attached page. The Navy sincerely appreciates the extra effort the U.S. Fish and Wildlife Service, particularly yourself and Mr. Bill Austin, have invested in this consultation to listen to the Navy's proposal and develop the revised Biological Opinion.

If you have any questions, please contact Mr. Timothy A. Burr, Wildlife Biologist, at (619) 532-3745.

Sincerely,

for MICHAEL STROUD
Natural and Cultural Resources Lead, SST
By direction of the Commander

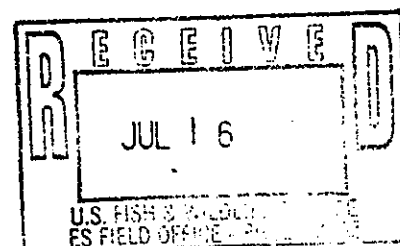
Copy to:

LCDR M. Roth, U.S. Naval Observatory, 3450 Massachusetts Avenue N.W., Washington, DC
20392-5420

Conard Dahn, Director, U.S. Naval Observatory, P.O. Box 1149, Flagstaff, AZ 86002-1149

Bill Austin, USFWS Phoenix Field Office, Flagstaff Suboffice, 5075 #Hwy 89, Flagstaff, AZ 86004

Walter Briggs, EFA, Northwest, 19917 7th Avenue N.E., Poulsbo, WA 98370-7570



PROPOSED CHANGES TO THE
APRIL 15, 1998 REVISED DRAFT BIOLOGICAL OPINION,
AESO/SE 2-21-97-F-110

1. Page 20, 5th paragraph, beginning of the 4th line: AFTER "discovered...." ADD "within the PAC".
2. Page 20, 5th paragraph, end of the 2nd to the last line: CHANGE "an" TO "a" and ADD "potential" between "a" and "adverse effect.....". NO
(Add - 1)
3. Page 21, 1st paragraph, last line: CHANGE "an" TO "a" and ADD "potential" between "a" and "adverse effect.....". NO
(Add - 1)